REMARKS

Claims 1-13 are pending. The independent claims are method claim 1, receiver claim 8, system claim 9, and software claim 13.

The non-final Office Actions reject claims 1-13 as being inoperative under 35 U.S.C. § 101. Hereinafter, "the Office Action" will refer to the Office Action dated September 2, 2004 rather than the Office Action dated October 20, 2004.

The Office Action also rejects claims 1-13 as lacking enablement under 35 U.S.C. § 112. Claims 1-13 are further rejected as being anticipated by *Kilfeather* (U.S. Patent No. 6,243,648), and alternatively by *Belcea* (U.S. Patent No. 6,728,545).

The present application aims at determining the position of a receiver in situations in which the number of available beacons is less than the minimum required by conventional methods (page 4, paragraph 5).

Independent claim 1 relates to a method for estimating the position of a receiver receiving code-modulated signals from at least one beacon comprising the features of

(A) delimiting a region containing the receiver position, (B) based on a code modulated signal received at the receiver from at least one beacon, and (C) also based on available information including at least initial information on the receiver position. Amended claim 1 also contains ther features of (D) estimating the receiver position as a position within the delimited region which minimizes an error criterion, and (E) ***the error criterion is at least one of a mean square error of a position within the delimited region, a mean absolute error of a position within the delimited region and a maximum error of a position within the delimited region.***

Amendments

Independent claims 1, 8, 9, and 13 are now amended by including the limitations of original claim 2. Therefore claim 2 is now cancelled.

The paragraph beginning at page 15, line 33 is now amended by clarifying that in this embodiment "n" is at least two. This is supported, for example, by present claim 5. It is also supported by the equation at page 16, line 18 of the application, which says that $i<j$, meaning that satellite "i" and satellite "j" are not the same satellite, so more than one satellite must be under consideration.

Operability and Enablement

The Office Action states in the first full paragraph on page 3 that "the procedure breaks down." The Office Action is referring to the equation for "ME" at page 16, line 18 of the application, which is used for a pre-selection. The Office Action contends that this equation makes no sense if only signals from a single beacon are received. Actually, however, this equation in the application compares values that are determined based upon the signals from ***more than one beacon*** instead of a single beacon. This point is clarified by the amendment of the specification, described above.

Further, it is pointed out that this equation only serves for reducing the number of gridpoints in a preparatory step, before an error criterion is minimized for the remaining gridpoints. The actual minimizing of an error criterion is only dealt with later, beginning on page 16, line 32. Thus, the equation at page 16, line 18 does not affect the operability of the claims, as the method works with or without this step (which is only mentioned in claim 5).

The Office Action also asserts (at the last sentence on page 3) that in case of two beacon signals, ME would be the time difference between when the signal from the first satellite was received and the signal from the second satellite was received. However, the Office Action does not point out any specific problem relating to operability of that interpretation. That interpretation is correct, and in fact does not detract from the operability

of the invention; indeed, it is also mentioned in claim 5 that the differences between calculated times of arrival are to be compared with a threshold value.

Applicant respectfully submits that the amended application has no problems of operability or enablement.

Summary of *Kilfeather* and *Belcea*

The examiner is of the opinion that the subject matter of all claims is disclosed by either of these two documents.

According to *Kilfeather*, a system comprises a terminal of which the position is to be determined, a communication satellite, which may communicate with the terminal, and a plurality of GPS satellites. An arc of locations is determined by computing an intersection of a sphere centered at the communication satellite and having a radius given by a calculated range from the satellite to the terminal with a model of the earth's surface. Only that portion of the arc within the region bounded by the satellite beam pattern is retained. Using discrete points on the arc as an initial guess, an iterative least squares technique fits the observation data on GPS signals to predicted data and minimizes residual error (Fig. 1, Abstract; col. 4, lines 28-36).

According to *Belcea*, a mobile terminal can receive location messages transmitted by several fixed terminals and can determine the respective distances to each of the fixed terminals. Due to errors, curves around the fixed terminals with the determined distance may not intersect at a single location. It is thus an aim to estimate the most probable location of the terminal. To this end, a minimizing technique is employed, e.g., minimizing the sum of square of errors, which—according to the Gauss's postulate—results in the most probable approximation of a measure. In this minimization, for each considered fixed terminal the fixed terminal location (x_i, y_i, z_i) and the determined distance r_i to this terminal are considered (col. 5, line 64, to col. 6, line 64).

Novelty and Non-obviousness In View of *Kilfeather* and *Belcea*

The Office Action asserts that the features of original claims 1 and 2 –which are now combined—are known from both cited references. However, concerning claim 2, the Office Action does not refer to any particular passages in the two cited references.

The cited prior art documents minimize an error criterion. However, they do not minimize a mean square error, a mean absolute error, or a maximum error of a position within a delimited region (see feature E described above).

The advantage of dealing with these types of errors is that they allow finding a position by evaluating exclusively the delimited region itself. That is, no further beacon signals are required than those used for delimiting the region. For example, in a circular region, the center point can be wrong at most by the radius of the circle, while a point at the border of the circle can be wrong at most by the diameter of the circle. The center point would thus minimize a maximum error of a position within the delimited region. As indicated in the specification, the resulting position may not be exactly correct, but the position can be determined immediately and its possible deviation from the true position will then be as small as possible (see page 7, first paragraph of application). In the specification, these minimizations are represented by the equations on pages 17 and 18, which all rely exclusively upon gridpoints in a delimited region.

However, in the cited documents, the error minimization is always based upon the evaluation of received (beacon) signals, which have to be available in sufficient number. In the *Kilfeather* document, a "multitude of GPS signals" (col. 5, lines 32-33) are mentioned to be evaluated, and in the *Belcea* document, the evaluation of at least four signals are required (col. 3, lines 47-49).

Concerning the *Belcea* reference, the following factors should also be considered. This document aims as well at positioning a receiver (mobile terminal). To this end, spheres or cycles around each of the fixed terminals are considered. These spheres or cycles are explicitly mentioned to be subject to errors, though. Rather than delimiting a region in which

the terminal is located (see feature A described above), they are thus first approximations which can vary in any direction. Further, while the fixed terminals might be assumed to possibly transmit code modulated signals which are employed by the receiver for determining the distance to the fixed terminals, a reference position of the terminal is not evaluated in determining the spheres or cycles (see feature C described above).

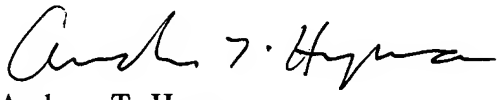
On the whole, original claim 1 restricted with the features of original claim 2 is new and non-obvious in view of the cited references. Likewise, the other independent claims comprise features corresponding to the steps of independent method claim 1, and therefore the same comments apply as for claim 1. Similarly, the dependent claims should be considered to be grantable due to their reference to a respective new and non-obvious independent claim.

CONCLUSION

Applicants respectfully submit that the amended claims 1-13 of the present application define patentable subject matter and are patentably distinguishable over the cited references for the reasons explained. The rejections of the non-final Official Actions of September 2, 2004 and October 20, 2004 having been shown to be inapplicable, retraction thereof is requested, and early passage of claims 1-13 to issue is earnestly solicited.

Applicant would appreciate if the Examiner would please contact Applicant's attorney by telephone, if that might help to speedily dispose of any unresolved issues pertaining to the present application.

Respectfully submitted,



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